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Incidence of childhood cancers in Poland in 1995–1999

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A Study Design
B Data Collection
C Statistical Analysis
D Data Interpretation
E Manuscript Preparation
F Literature Search
G Funds Collection

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Summary

Background: The annual rate for childhood cancers in developed countries amounts to 105–130 new cases per 1 million children. The Polish population aged 0–17 years is estimated at approximately 10 million children and adolescents, thus ca. 1100–1300 new cases can be expected every year. In 1995, we started a national childhood cancer registry.

Material/Methods: Information on the new diagnoses of childhood cancers was collected in 11 regional centers and submitted to the national center in Lublin. All data were verified carefully and standardized incidence rates were calculated.

Results: In 1995, we registered 1028 newly diagnosed malignant neoplasms, in 1996 and 1997 – 1036 cases, in 1998 – 1007, and in 1999 – 1158 new cases. The estimated incidence rates were: 102.4; 109.5; 111.9; 111.6 and 118.3 per 1 million children, respectively. The most frequent childhood cancers include leukemia, which accounts for 28% of cancer cases, lymphoma (14.3%) and C. N. S. tumors (16.3%).

Conclusions: Neoplasms of the hematopoietic system (leukemias and lymphomas) account for about 42% of all childhood cancers. Malignant lymphomas, bone tumors and germinal tumors are more frequently diagnosed in Poland, but the incidence of central nervous system tumors is lower than in other countries.

key words: **childhood cancer • epidemiology**

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BACKGROUND

Childhood tumors are very differentiated with respect to histological types and anatomical locations. According to the International Classification of Diseases for Oncology (ICD-O) and International Classification of Childhood Cancers (ICCC) [1,2], 12 main diagnostic groups of neoplastic diseases are distinguished. The incidence of these tumors considerably differs from that observed in adult population. In many countries, analyses of incidence of individual childhood cancers is currently analyzed on the basis of registers made according to that classification. In Poland, information concerning childhood cancers has been available so far in the National Register of Neoplasms, elaborated by Maria Skłodowska-Curie Oncology Center, based on organ-related classification of tumors characteristic of adult age [3]. The system gives rise to some problems associated with analysis of cancer incidence in the population aged from 0 to 17 years. For that reason, the National Team of Medical Consultants in pediatric oncology initiated in 1995 an attempt to create a National Register of Childhood Cancers, enabling detailed analysis of their incidence according to the ICD-O classification.

MATERIAL AND METHODS

Since 1995, as a part of nationwide surveillance in the field of pediatric oncology, own registration of all new cases of neoplastic diseases diagnosed in children in each calendar year has been kept. All reports of new cases were collected by Regional Consultants and submitted to the center in Lublin. Individual entries, including personal particular of the patients, were then verified to avoid counting the same patients consulted or treated in more than one center several times. Additionally, the diagnoses were verified in co-operation with individual centers. The obtained raw data illustrating the morbidity with respect to various types of childhood cancers were used to calculate standardized incidence rates per 1 million children, based on standard world population [4].

RESULTS

In 1995, 1028 newly diagnosed malignant neoplasms were registered among children from 0 to 17 years of age, in 1996 and 1997 – 1036 cases, in 1998 – 1007, and in 1999 – 1158 new cases (Table 1). The estimated standardized incidence rates, related to standard world population were: 102.4; 109.5; 111.9; 111.6 and 118.3 per 1 million children, respectively. New cases according to tumor types are presented in Table 2. As it follows from that table, no significant changes in the numbers of new cases of particular tumor types were noted during the 5-year period of registration. However, it can be seen that lymphomas, bone tumors and germinal tumors are more frequent in Poland than in other European countries, whereas CNS tumors occur less frequently (Table 3).

Table 1. New cases of all malignant tumors in 0–17 age group in Poland and morbidity rates per 1 million in 1995–1999.

Year	1995	1996	1997	1998	1999
Number of cases	1028	1036	1036	1007	1158
Incidence/1 million	102.4	109.5	111.9	111.6	118.3

Table 2. Incidence of various tumor types among children and adolescents in Poland in 1995–1999.

Year	1995	1996	1997	1998	1999
Leukemias	332	265	310	281	308
ALL	257	212	262	245	248
ANLL	58	46	39	28	48
Lymphomas	122	161	152	155	175
NHL	68	79	73	89	83
HD	54	82	79	66	92
Brain tumors	204	190	156	119	188
Sympathetic system tumors	68	67	73	75	72
Retinoblastoma	21	28	26	34	22
Renal tumors	67	79	63	58	77
Hepatic tumors	14	17	12	17	16
Bone tumors	82	74	79	100	73
Soft tissue tumors	66	70	69	66	40
Gonadal and germinal tumors	52	54	66	68	89
Epithelial tumors	7	19	11	17	9
Others	3	12	20	19	58

Table 3. Incidence of various childhood tumors in Poland (according to data from 1995–1999) and in Europe.

Tumor group	Poland	Europe
Leukemias	28.7%	33.5%
Lymphomas	14.3%	9.9%
Brain tumors	16.3%	22.6%
Sympathetic system tumors	6.9%	6.8%
Retinoblastoma	2.7%	3.35
Renal tumors	6.5%	6.9%
Hepatic tumors	1.5%	0.9%
Bone tumors	8.2%	4.2%
Soft tissue tumors	6.6%	6.0%
Gonadal and germinal tumors	5.8%	2.3%
Epithelial tumors	1.3%	1.8%
Others	1.3%	0.2%

DISCUSSION

The annual rate for childhood cancers in developed countries amounts to 105–130 new cases per 1 million children. Thus, in a region inhabited by 50–75 thousand children, 5 to 10 new cases can be expected to occur every year [5–8]. In some geographical regions, however, this incidence is higher. It amounts to over 140 new cases per 1 million population in Nigeria, Los Angeles (white population), Sao Paulo in Brazil, New Zealand, Sweden and Australia [5,9]. In Poland there are currently ca. 10 million children aged from 0 to 17 years (Table 4). Based on European data, ca. 1100–1200 new cases a year can be expected. At the same time, the number of patients undergoing treatment (lasting up to

Table 4. Polish population aged 0–17 years (according to Central Statistical Office data).

1995	10,644,803
1996	10,417,517
1997	10,165,537
1998	9,888,636
1999	9,613,822

3 years in some tumor types) or monitored during the periods of remission until they can be considered as cured is cumulating. Therefore, it can be assumed that there are 5 to 6 thousand children who have undergone treatment for neoplastic diseases in Poland. This number will increase every year, because the currently used methods of treatment make it possible to cure most of these patients.

Leukemias, mainly of acute lymphoblastic type, are most frequent tumors among Polish children, accounting for over 28% of all tumor types. Taken together with lymphomas (over 14%), tumors of the hematopoietic system account for ca. 42% of all childhood neoplasias, similarly as in other countries [5–7,9–14]. Central nervous system tumors, accounting for ca. 16% of all tumor cases, constitute the second most prevalent cancer group (Table 3).

Various childhood cancers are characterized by different incidences in particular age groups. Peak incidence occurring during the earliest years of life characterizes embryonic tumors. This is why most cases of neuroblastoma, retinoblastoma or hepatoblastoma are diagnosed during the first year of life [12–15]. The onset of acute lymphoblastic leukemia occurs most frequently between 2 and 4 years of age. Adolescence is the age associated with the highest incidence of Hodgkin's disease, osteosarcoma and Ewing sarcoma [12–18]. In the case of fibromyoma, two periods of peak incidence are observed: the first one in infancy, and the second one between 10 and 14 years of age. Similar distribution is observed with respect to germinal gonadal tumors. In boys, they are most often diagnosed in early childhood, then the incidence falls rapidly to increase again before 15 years of age and remain at higher level until the end of the pubescence period. In girls, on the other hand, such tumors are uncommon in early childhood and their incidence increases during the pubescence period [14,15]. The incidence of childhood cancers is generally slightly higher among males than among females with the ratio of 4:3. The predominance of male patients is the highest with respect to lymphomas, less marked with respect to leukemias, brain tumors, neuroblastoma, osteosarcoma and soft tissue sarcomas. Wilms tumors and retinoblastoma occur in both sexes with the same incidence. Girls suffer more frequently from germinal tumors, adrenal cortex and thyroid gland carcinomas [6,8,14,15].

Continuation of analysis of new childhood cancer cases will allow to observe changes in the incidence of particular tumor types [19]. Compliance of the system with classification typical of childhood cancers will allow to compare the data with those obtained in other countries.

CONCLUSIONS

1. In Poland the annual number of new cases of malignant tumors ranges from 102 to 118 per 1 million children and adolescents below the age of 18.

2. The most common childhood cancers are neoplasias of the hematopoietic system – leukemias and lymphomas, accounting for ca. 42% of all cancers diagnosed in this age group.

3. Malignant lymphomas, bone tumors and germinal tumors are more frequent in Poland than in other European countries, whereas CNS tumors occur less frequently.

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